Joint Application For PSCW Certificate of Public Convenience and Necessity And WDNR Utility Permit Application (Part 2)

PSCW Docket No. 137-CE-139

North Madison to Huiskamp Transmission Project

February 2006

INTRODUCTION AND OVERVIEW

TECHNICAL SUPPORT DOCUMENT

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ACSR	Aluminum Conductor, Steel Reinforced
ATC	American Transmission Company
BMPs	Best Management Practices
Commission	Public Service Commission of Wisconsin
CPCN	Certificate of Public Convenience and Necessity
CTH	County Trunk Highway
EMF	electromagnetic field
FAA	Federal Aviation Agency
FERC	Federal Energy Regulatory Commission
ft	feet
GOAB	Gang-Operated Air-Break
I	Interstate
kA	kilo ampere
kcmil	kilo circular mils
kV	kilo volt
mG	milligauss
MGE	Madison Gas and Electric Company
MISO	Midwest Independent Transmission System Operator
mm^2	millimeters squared
MW	megawatt
MWh	megawatt-hour
MVA	megavolt amperes
NERC	North American Electric Reliability Council
OPGW	Optical Ground Wire
PSCW	Public Service Commission of Wisconsin
p.u.	per unit
RMS	root mean square
ROW	right-of-way
STH	State Trunk Highway
TSD	Technical Support Document
TSR	transmission service request

USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WDNR	Wisconsin Department of Natural Resources
WHS	Wisconsin Historical Society
WisDOT	Wisconsin Department of Transportation

A. OVERVIEW

American Transmission Company LLC and ATC Management Inc., its corporate manager, known collectively as American Transmission Company (ATC), own and operate electric transmission facilities, and transact business as a transmission company with the sole purpose of planning, constructing, operating and maintaining transmission facilities to provide electric transmission service. ATC is obligated to provide adequate and reliable electric transmission service that meets the needs of all transmission users in the areas it serves and that supports effective competition in energy markets without favoring any market participant.

In order to meet this obligation, pursuant to *Wis. Stat.* §§ 196.49, 196.491, 1.11, and 1.12(6) and *Wis. Admin. Code* chs. PSC 111, 112 and 4, ATC hereby applies to the Public Service Commission of Wisconsin (PSCW or Commission) for a Certificate of Public Convenience and Necessity (CPCN) and any other authorization needed to modify existing transmission facilities and construct new transmission facilities in the village of Waunakee, and the towns of Vienna and Westport, all located in Dane County, Wisconsin. The proposed project would construct and place in operation approximately eight miles of new 138 kV transmission line extending from the North Madison Substation, located in the town of Vienna, in a southerly direction to the Huiskamp Substation, located in the town of Westport. Related additions at the North Madison and Huiskamp substations to connect the new line, and other minor changes at remote substations will also be necessary.

B. PURPOSE AND NECESSITY

Higher than average electric load growth in Dane County, particularly to the west and south of the city of Madison, is creating a need for additional high capacity supplies into the area. Electric demand in this area is projected to grow at a rate of 4% per year between 2004 and 2012 compared to 2.5% per year for the entire ATC service area. The high demands in the west and south of Madison area are creating overloading of the lines in northern Madison.

Portions of Dane, Middleton, Waunakee, Westport and the northeast side of Madison are supported by a network of 69 kilovolt (69 kV) transmission lines that are used to near-maximum capacity during the peak summer season. These lines are projected to be overloaded in the summer of 2009. Because there is no excess capacity and little redundancy, there is also limited ability to take these lines out of service for maintenance, resulting in even further reduced reliability and increased operating costs.

The proposed project would provide numerous benefits for the Madison metropolitan area and Dane County, including prevention of transmission

line overloads, support for load growth in the area, improved transfer import of power, increased redundancy, reduced system losses by over 3 MW during peak load periods and would eliminate the need for pre-contingency re-dispatch of high cost generation in Dane County. The proposed transmission line would pass near or through the village of Waunakee. North Madison-Huiskamp is one of several transmission improvement projects that has been proposed for Dane County. The other projects will be addressed in separate applications.

C. DESCRIPTION

American Transmission Company has determined that the best solution to address system reliability and service concerns in Dane County includes constructing a new 138 kV transmission line as follows:

1. Construct a new North Madison-Huiskamp 138 kV line on approximately 8.5 miles of new right-of-way (ROW).
2. Install a 138 kV circuit breaker at the North Madison Substation.
3. Construct a new 138 kV bus at the Huiskamp Substation.
4. Install a 187 MVA, 138/69 kV transformer at the Huiskamp Substation.
5. Install a 69 kV circuit breaker at the Huiskamp Substation.
6. Upgrade various terminal facilities as needed.

Additional detail and supporting information for the proposed project is provided in the attached Technical Support Document (TSD). The TSD follows the format and guidance from the Commission's "Information Requirements for Applications to Construct Electric Transmission Lines and Substations," (Part 2.00), Version 15B. Detailed facilities information is provided in Section 2.1 of the TSD.

D. PROJECT COST

American Transmission Company estimates the total gross project cost, depending on the transmission line route selected by the Commission, to be $12,032,300 (Preferred Route) or $12,126,700 (Alternate Route) as set forth in greater detail in Section 2.1.7 of the attached TSD.

E. CONSTRUCTION SCHEDULE

Construction is planned for October 2007 through June 2008. Additional detail is provided in Section 2.1.8 of the attached TSD.

F. ENTITIES AFFECTED BY THE PROJECT

Several federal, state, regional and local units of government are affected by this project. Appropriate permits will be obtained prior to construction of the new facilities, as discussed in Section 2.9.3 of the attached TSD. Mailing lists in the prescribed format for affected public, government officials, libraries and other entities requiring project notification are provided in the TSD, Appendix G.

G. ENVIRONMENTAL IMPACTS

American Transmission Company believes this project is categorized as a Type II action pursuant to *Wis. Admin. Code* § PSC 4.10(2). Information necessary for preparation of an environmental assessment is provided in the attached TSD.

In accordance with *Wis. Stat.* § 30.025(1s), ATC submitted Part 1 of its Utility Permit Application for permits to the Wisconsin Department of Natural Resources (WDNR) for the proposed project on January 9, 2006. (Note: The Application erroneously listed the submission date as January 9, 2005—which is a typographical error.) Part 1 included the required permit application forms. A copy of Part 1 is provided in Appendix E of the TSD. This joint Application to the Commission and WDNR includes Part 2 of ATC's Application for utility permits. The information contained within this joint Application includes the detailed technical information supporting ATC's Application for permits is contained in the attached TSD and appendices and is being submitted to the WDNR by copy of this Application required by the WDNR to evaluate and issue the required permits for construction.

H. PROPERTY OWNERS AFFECTED

American Transmission Company held a series of public open houses in the village of Waunakee to introduce the project to the public and answer questions. A chronology of public communications and written feedback from open house attendees and others is provided in the TSD, Appendix F.

I. COST OF OPERATION AND RELIABILITY OF SERVICE

American Transmission Company believes the proposed project is the most appropriate means for discharging its obligation as a public utility and transmission company charged with the obligation of providing reliable transmission service to all users. The proposed transmission facilities are necessary to meet growing electrical needs of ATC's transmission service customers so they may continue to provide reliable distribution service to their customers. The proposed facilities meet this need and do not provide facilities in excess of present and probable future requirements. When placed in operation, the proposed facilities will not result in annual costs

disproportionate to the service value of the work performed or the quantity of available service.

J. CONCLUSION

Based on the material contained, set forth, or adopted for inclusion in this Application, and any subsequent material requested by the Commission or its staff, relative to this joint Application, American Transmission Company LLC and ATC Management Inc. request that the Commission issue a Certificate of Public Convenience and Necessity authorizing the construction of the transmission facilities as described and in the manner set forth.

Respectfully submitted this 20th day of February, 2006.

American Transmission Company LLC and ATC Management Inc.

/S/ Stephen Parker

Stephen Parker
Manager, State Regulatory Affairs
ATC Management Inc.

This Technical Support Document (TSD) follows the format and guidance contained in the Commission's "Information Requirements for Applications to Construct Electric Transmission Lines and Substations," (Part 2.00), Version 15B.

2.1 ENGINEERING INFORMATION

2.1.1 Type and Location of Line Construction

American Transmission Company proposes to construct a new 138 kV transmission line primarily on steel single-pole structures. The new line will primarily be a single-circuit line. Segments of the line could be double-circuit configuration depending on the route approved by the Commission.

The new line will run from the existing North Madison Substation, located in the town of Vienna, to the existing Huiskamp Substation, located in the town of Westport, all in Dane County. The line will be approximately 8.5 miles long depending on the route approved by the Commission. It will be routed through the towns of Vienna and Westport, and in and around the vicinity of the village of Waunakee.

The project area is shown on the maps contained in Appendix A and in ATC's Utility Permit Application for Permits from the Wisconsin Department of Natural Resources (WDNR) contained in Appendix E. The map in Appendix A, Figure 1, is an overview of the project area showing the location of the Preferred and Alternate transmission line routes.

The Preferred Route is comprised of route segments 1, 56, 47, 49, 58, 9, 14, 26, 32, 61, 35, and 36.

The Alternate Route is comprised of route segments 2a, 2b, 3, 43a, 45, 8b, 13, 24, 27, 31, 34, and 36.

With the addition of the new transmission line, it will be necessary to re-terminate the existing North Madison-Sycamore 138 kV steel pole transmission line at North Madison Substation, modify one wood pole structure on the existing North Madison-DeForest 69 kV line, and re-configure part of the existing Waunakee-Huiskamp 69 kV lattice tower line. Related Huiskamp Substation modifications are discussed in Section 2.1.4.

2.1.2 General Description

2.1.2.1 Size of Lines

The proposed transmission line will be constructed and operated as a 138 kV line, primarily on single-pole structures with span lengths of

approximately 400 to 600 feet. On average, structure heights are expected to range between approximately 75 and 110 feet above ground, depending on the terrain, number of circuits and the presence of distribution underbuild circuits on ATC structures. Typically, 138 kV braced horizontal line-post insulators will be used for the transmission line and standard distribution cross arm assemblies will be used for any under-build distribution circuits. A typical single-pole, single-circuit structure is depicted in Appendix A, Figure 15.

Double-circuit, single-pole structures are proposed on route segments 1 and 36 (Preferred Route) and 27, 31, 34, & 36 (Alternate Route) to accommodate a double-circuit configuration with existing transmission lines. Appendix A, drawing T-OHD-STR-250, depicts a typical single-pole, double-circuit structure with braced-post insulators.

Distribution line facilities will be under-built on the new line structures where appropriate. Additional information regarding the type of structure (including those hosting distribution underbuild) for each route segment is provided in the magnetic field study in Appendix C.

The transmission conductor on all new facilities will be T2-477 kcmil, 26/7 ACSR ("T2-Hawk"), or equivalent round-wire conductor. This conductor type was chosen so that compact structures with narrow dimensions can be used in order to minimize new easement width and permit construction within existing easement constraints. The T2 Hawk conductor is not as susceptible to galloping as standard ACSR conductors, so a more compact configuration can be used. T2-477 conductor also meets the load capacity assumptions used in the transmission studies performed in developing this project. Those studies are contained in Appendix B Exhibit B-1. In areas of double-circuit configuration, T2-477 would be used for the North Madison to Sycamore circuit (existing conductor is 954 kcmil, 45/7 ACSR "Rail"), and T2-477 would also be used for the Waunakee to Huiskamp circuit (existing conductor is 795 kcmil, 26/7 ACSR "Drake").

ATC proposes to install optical ground wire (OPGW) for the shield wire between North Madison and Huiskamp substations to provide for ATC protective relaying and communications between substations. On double-circuit structures, the second shield wire would be 7/16-inch EHS shield wire.

2.1.2.2 Transmission Line Configuration

The proposed transmission line configuration is primarily a single-circuit line on new right-of-way (ROW), with a vast majority of the ROW being shared with existing overhead distribution circuits and road ROW, with the following exceptions:

Segment 1 (Preferred Route). There is an existing 138 kV line (North Madison to Sycamore) that will not be double circuit with the new 138 kV line. Therefore, additional ROW acquisition will be required as the proposed line cannot be accommodated on the existing ROW. The two single-circuit 138 kV lines will run parallel. In this case, additional ROW would need to be acquired adjacent to and south of the North Madison to Sycamore line.

Segment 24 (Alternate Route). At the south end of segment 24, the transmission line would turn south at the west end of Uniek Drive/Foundation Circle and travel along an active railroad spur. A full 138 kV ROW would be required in this portion of segment 24.

Segments 27, 31, and 34 (Alternate Route) and 36 (common to both Preferred and Alternate Route). These segments will be constructed on existing transmission line ROW, and will be a double-circuit line consisting of the new 138 kV line and the existing Waunakee to Huiskamp 69 kV line.

Segment 35 (Preferred Route). At the far west end of segment 35, the proposed transmission line would be on new ROW adjacent to the Wingra Redi-Mix Plant. This portion of segment 35 is not parallel to a road or distribution circuit.

New ROW acquired for the line will be 80 feet wide (40 feet on each side of centerline). Along roads, the transmission line centerline is expected to be approximately 5 feet inside private property lines, with a total of 45-foot overall width on private property. The center of any large diameter concrete footings may need to be more than five-feet on private property so that no part of the footing is on road ROW. Portions of the proposed line may be constructed within highway ROW along state trunk highway (STH) 113. ATC has consulted with the Wisconsin Department of Transportation (WisDOT) to determine if any portion of the line may be routed within the state highway ROW, where necessary and appropriate, to further minimize the incremental impacts of the new line on the environment and private land owners. Conditions for locating the line within highway ROW are discussed in Section 2.4.1.3.

2.1.3 Transmission Studies

American Transmission Company performs evaluations as part of its planning process to identify existing and emerging concerns with the operation and reliability of its electric transmission system. As a result of these evaluations, ATC has identified emerging overloads on lines under normal and first contingency conditions in the northern Dane County

area. A contingency condition occurs when a transmission system element is removed from service due to either planned or unforeseen events.

ATC has adopted National Electric Reliability Council (NERC) standards in evaluating transmission system needs.[1] In accordance with the NERC planning standards:

a) No system element (line, transformer, terminal equipment, etc.) should experience loading in excess of its normal rating for NERC Category A (normal) conditions; that is, with all transmission facilities in service.

b) No transmission element should experience loading in excess of its applicable emergency rating for applicable Category B (loss of single element) contingencies.

Sustained overloads may cause damage to the transmission system and may result in rotating load shedding or customer outages.

ATC's evaluations identifying needs in the Dane County area under normal and contingency transmission system conditions, together with alternatives considered are set forth in ATC's Management Scope Document provided in Appendix B, Exhibit B1. ATC's evaluation and conclusions are summarized below.

2.1.3.1 System Normal

The transmission system in northern Dane County is presently adequate under normal operating conditions. However, due to residential, commercial and industrial load growth, ATC's planning studies predict overloads on the North Madison-Dane 69 kV line under normal intact conditions before 2014 summer peak load conditions.

Normal System Intact Overloads

Year	Circuit Overloaded	% Loading	Contingency
2009	North Madison-Dane	90	Intact System
2010	North Madison-Dane	93	Intact System
2014	North Madison-Dane	113	Intact System

[1] Additional information on ATC's planning standards and evaluations in general can be found in ATC's 10-year Assessment. ATC's current 10-year assessment can be found at http://www.atc10yearplan.com/

2.1.3.2 Single Contingencies

A single-contingency analysis was performed on the transmission system in Dane County. ATC planning studies predict an overload on Blount-Ruskin 69 kV lines and North Madison-Dane 69 kV line under peak load condition in 2009 with a single contingency. By 2014, a single contingency will also cause overloads on the Christiana-Kegonsa lines. The severity and number of overloads will increase with time without the recommended project. The results of the analysis are as follows:

Single Contingency Overloads

Year	Circuit Overloaded	% Loading	Contingency
2009	Blount-Ruskin 1	118%	Blount-Ruskin 2
2009	Blount-Ruskin 2	118%	Blount-Ruskin 1
2009	North Madison-Dane	102%	West Middleton-Pheasant Branch
2009	North Madison-Dane	99%	North Madison-ABS
2009	North Madison-Dane	97%	North Madison-West Middleton
2010	Blount-Ruskin 1	119%	Blount-Ruskin 2
2010	Blount-Ruskin 2	119%	Blount-Ruskin 1
2010	Blount-Ruskin 1	100%	North Madison-Dane
2010	Blount-Ruskin 2	100%	North Madison-Dane
2010	North Madison-Dane	102%	West Middleton-Pheasant Branch
2010	North Madison-Dane	105%	North Madison-ABS
2010	North Madison-Dane	101%	North Madison-West Middleton
2014	Blount-Ruskin 1	122%	Blount-Ruskin 2
2014	Blount-Ruskin 2	122%	Blount-Ruskin 1
2014	Blount-Ruskin 1	108%	North Madison-Dane
2014	Blount-Ruskin 2	108%	North Madison-Dane

Year	Circuit Overloaded	% Loading	Contingency
2014	North Madison-Dane	128%	West Middleton-Pheasant Branch
2014	North Madison-Dane	118%	North Madison-ABS
2014	North Madison-Dane	130%	North Madison-West Middleton
2014	North Madison-Dane	106%	Christiana-Kegonsa
2014	North Madison 138/69 kV Tr.	104%	North Madison-ABS
2014	North Madison-ABS	107%	North Madison 138/69 kV Tr.
2014	North Madison-ABS	112%	Kegonsa-McFarland
2014	North Madison-ABS	104%	North Madison-West Middleton
2014	North Madison-ABS	99%	Christiana-Kegonsa Circuit 1
2014	Christiana-Kegonsa 2	108%	Christiana-Kegonsa Circuit 1
2014	Christiana-Kegonsa 1	108%	Christiana-Kegonsa Circuit 2

2.1.3.3 Alternative Network Solutions

Five alternatives were initially developed and evaluated to address the reliability issues in northern Dane County to relieve overloads on lines. Transmission system performance was evaluated by modeling each of the alternatives under 2009 summer peak conditions and beyond. ATC then applied its transmission system planning criteria to evaluate each alternative under various transmission line and equipment outages. The planning criteria applied included:

- No transmission line or transformer normal summer ratings exceeded under normal system intact conditions.
- No transmission line or transformer emergency summer ratings exceeded under single contingency conditions.

Alternative network solutions were developed and examined in ATC's Management Scope Document (MSD) provided in Appendix B, Exhibit B1. Cost estimates in this application are 1.2% greater than those in the November 2005 MSD as a result of a revised estimating method. All estimated costs in this document are in 2008 dollars. The alternative options are summarized below:

1. Construct a new North Madison-Huiskamp 138 kV line – Preferred Route.

Based on the system performance, constructability capital costs, losses, and overall least construction cost impact to ATC, Waunakee Municipal Utility and Madison Gas and Electric along with the least environmental impact, Option 1 is the preferred alternative because it provides the most economical solution. The construction cost estimate for this alternative is $12 million.

2. Construct a new North Madison-Waunakee 138 kV line – Alternate Route.

The performance of this alternative is comparable to the recommended project; however, the project cost would be considerably higher. The higher cost is primarily driven by the need for a new substation site at Waunakee with 138 kV and 69 kV buses. In contrast, the recommended project will terminate at Huiskamp substation which already has a 69 kV bus and was designed with room for the future addition of a 138 kV bus. The construction cost estimate for Option 2 is $17 million.

3. Construct a new Dane-Waunakee 138 kV line and convert North Madison-Dane 69 kV line to 138 kV operation.

This alternative will eliminate the need for new right-of-way and meets the system needs in 2009 but does so at significantly higher cost without any long-term advantage. Though it performs comparably to the options put forth in this Application, it will cost about seven million dollars more than the recommended project. The construction cost estimate for Option 3 is $23 million.

4. Construct a new Yahara River-Waunakee 69 kV line.

This alternative would be lower cost by about one million dollars (construction cost) but will perform poorly compared to the recommended project. The loading on Blount-Ruskin and North Madison-Dane 69 kV lines will be reduced to 92% and 98% respectively in 2009, but overloads will re-emerge in the following years thereby being only a temporary solution (MSD, Appendix B,

Exhibit B1: Table 5). The construction cost estimate for Option 4 is $12 million

5. Construct a new Sycamore-Ruskin 69 kV line.

This 69 kV line alternative was not deemed to be a viable solution because it will eliminate some but not all overloads and would provide poor long term performance. The construction cost estimate for Option 5 is $9 million, approximately $3 million dollars less than the recommended option. (See MSD, Appendix B, Exhibit B1, Section 9: Table 12 for further detail).

NOTE: Although Options 4 and 5 are less expensive. These options only provide a 69 kV solution, in addition, each performs poorly and do not allow the ability to implement a long term solution that the 138 kV option provides.

2.1.3.4 Electrical Losses for Each Alternative

A loss analysis was performed for the proposed project and the considered Alternatives. The results of the analysis and comparison of the proposed project and alternatives are briefly described below and are contained in the ATC Management Scope Document in Appendix B.

Power losses at the time of peak are a measure of the additional generating capacity that must operate in order to deliver the power demanded by customers at the point of use. Transmission losses occur not only at the time of system peak, but throughout the year.

A system loss analysis was conducted using 2009 summer peak power flow. System loss comparison and projected savings on a 20-year base for the proposed project and other alternatives that were studied are listed in the table below. These saving include both loss reduction at peak and for those for the rest of the year. ATC's system loss benefit over 20 years is estimated to be approximately $15.72 million in 2008 dollars with the implementation of the proposed project which is comparable to savings from Option-2 and Option-3.

Loss Savings

	Present System	**Option-1** North Madison-Huiskamp 138 kV Line	**Option-2** North Madison-Waunakee 138 kV Line	**Option-3** North Madison-Dane Conversion 69 kV to 138 kV	**Option-4** Yahara River-Waunakee 69 kV Line	**Option-5** Sycamore-Ruskin 69 kV Line

				Dane-Waunakee double circuit 138 kV		
Conductor		ACSR T2-Hawk 2-477 kcmil 26/7	ACSR T2-Hawk 2-477 kcmil 26/7	ACSR T2-Hawk 2-477 kcmil 26/7	ACSR Hawk 477 kcmil 26/7	650 kcmil Cu HPFF Pipe Type Cable
System Losses MW	352	349	349	349	351	352
Reduction MW	0	3	3	3	1	0
20 Year Value NPV in 2008 $M	0	15.72	15.72	15.72	5.25	0
Energy Saving per Year GWH	0	17.47	17.47	17.47	5.82	0

The cost of energy is obtained from Power Daily North America an industry publication which is then averaged for peak and shoulder peak months. From industry literature the current capacity cost is $600-$800/kW to build, ATC loss analysis is based on capacity cost of $600/kW.

2.1.3.5 Short Circuit, Stability, and Thermal Analyses

This Application does not include a generator interconnection.

2.1.3.6 Distribution Needs and Alternatives

This Application does not include a new distribution substation. The proposed project will support the future needs of Dane County. Interconnection of any distribution substation to the ATC transmission network is not the basis for this project; therefore, no distribution

alternative is included in the ATC's Management Scope Document in Appendix B Exhibit B-1.

2.1.4 Substation Facilities

Modifications will be required at the North Madison and Huiskamp substations. All work at both substations will occur within the existing substation fence. Work at each of the substations includes:

North Madison Substation (7310 Patton Rd., Deforest, WI)

- Adding a transmission line dead-end structure with a new disconnect switch mounted on it within the substation.
- Install one new 3000 A, SF_6 circuit breaker to the existing ring bus.
- Relocate North Madison-Sycamore transmission line termination within the substation to the new substation dead-end structure, and connect the new North Madison-Huiskamp transmission line to the existing North Madison-Sycamore substation dead-end structure.
- Install new protection and control relay panels.

The layout of North Madison Substation is shown in Appendix B, Figure 3.

Huiskamp Substation (5484 Blue Bill Park Drive, Madison, WI)

- Add a new 187 MVA, 138/69 kV autotransformer within the substation fence. Add associated low-side circuit breaker and transformer protective relaying.
- Add a new 138 kV bus and 3000 A, SF_6 circuit breaker to the high side of the new transformer for connection to the new North Madison-Huiskamp transmission line with associated line protective relaying.
- Replace two 69 kV oil circuit breakers not capable of interrupting the additional fault current caused by the new 138 kV line.
- Expand existing control house to accommodate new relay panels and reserve space for future 138 kV relay and control equipment.

The layout of the Huiskamp Substation is shown in Appendix B, Figure 4.

Additional substation information can be found in Section 2.6.

2.1.5 Contractual Agreements

Not Applicable.

2.1.6 Transmission Service Agreements

Not Applicable.

2.1.7 Transmission Costs

2.1.7.1 Cost of Alternatives

North Madison to Huiskamp

Capital Cost	Preferred Route	Alternate Route
Transmission Line		
Facilities	$5,422,100	$5,655,500
Land/Land Rights	$1,432,300	$1,415,700
Distribution Underbuild	$597,000	$404,000
Transfer Costs		
Sub-total Transmission	**$7,451,400**	**$7,475,200**
Substation Construction		
North Madison	$548,200	$548,200
Huiskamp	$3,371,900	$3,371,900
Sub-total Substation	**$3,920,100**	**$3,920,100**
Total, Capital Cost	**$11,371,500**	**$11,395,300**
Removal	$60,600	$105,600
Expense (incl. Pre-certification)	$600,200	$625,800
Gross Project Cost*	**$12,032,300**	**$12,126,700**

*All costs in year of construction, 2008.

2.1.7.2 Regional Project Cost Benefit Allocation Study

This project is to address ATC's system needs. All costs will be born by ATC's transmission customers. Therefore, no cost benefit allocation study was performed.

2.1.7.3 Electrical Losses and Assumptions

As discussed in Section 2.1.3.4, an electrical loss analysis was performed for the proposed project. The results of that analysis are provided in the ATC Management Scope Document in Appendix B.

2.1.8 Construction Schedule

American Transmission Company projects completion of the proposed North Madison to Huiskamp Project on the following schedule:

Activity	Expected Schedule
Complete Detailed Engineering-Transmission Line and Substation	November 2006 - November 2007
Obtain Transmission Line Right-of-Way	January 2007 - February 2008
Transmission Line and Substation Construction Commenced	October 2007 - June 2008
Line In Service	June 2008
Project Complete	December 2008

Timing portions of the transmission line construction to occur during winter months, particularly in environmentally sensitive areas, will be of benefit in minimizing impacts to the environment.

2.1.9 Transmission Tariffs

American Transmission Company provides service under the FERC-approved open access transmission tariff of the MISO. Service will be provided over the proposed transmission line under the MISO tariff.

2.2 PROJECT DEVELOPMENT AND ALTERNATIVES

2.2.1 Local Level Alternatives

The proposed project is necessary to provide adequate and reliable transmission service to the Dane County area. Five alternatives were initially developed and evaluated to address the reliability issues in northern Dane County to relieve overloads on lines. Those alternatives, including the alternative chosen for this project are described in Section 2.1.3.3. Local level (distribution) alternatives were not considered.

2.2.2 Route Evaluation Factors

Siting of new transmission lines is a multi-stage process consisting of:

1. Identifying potential route corridors between established end-points meeting the routing priorities defined in *Wis. Stat.* § 1.12(6) (2003). These priorities, consistent with economic and engineering considerations, safety, and reliability of the transmission system and protection of the environment include, in order of priority:

   a. Existing utility corridors.

   b. Highway and railroad corridors.

   c. Recreational trails to the extent the facilities may be constructed below ground and do not significantly impact environmentally sensitive areas.

   d. New corridors.

2. Parsing identified corridors into discrete segments and recombining segments to identify potential transmission line routes. A variety of transmission line routes may be developed utilizing the various identified route segments. Possible transmission line routes are screened against several criteria, including those specified in *Wis. Stat.* § 196.491(3)(d), to determine the route alternatives as proposed in this Application. To the extent practical, these criteria include, but are not limited to:

   - Avoiding high-density residential areas.
   - Conforming with existing and proposed land use patterns.
   - Avoiding individual hardships.
   - Using existing ROW to minimize the need for additional facility ROW (corridor sharing).
   - Avoiding public and private hunting grounds, woodlands, flood plains and wetlands.
   - Maintaining compatibility with local agricultural practices.
   - Minimizing environmental impacts consistent with engineering and economic considerations.

3. Soliciting input from local landowners and public officials at various stages in the process to identify local issues and concerns with potential transmission line corridors and routes.

4. Performing a multidisciplinary review and evaluation considering and balancing the quantitative as well as qualitative factors discussed above along with design, engineering, economic, and operational considerations, to identify a minimum of two routes, Preferred and Alternate, for presentation to the Commission.

Potential route corridors and evaluated routes are discussed in further detail below. Potential corridors and evaluated routes are shown on Appendix A, Figure 2.

2.2.3 Route Corridor Alternatives

Major corridors in the proposed project area in Dane County include various transmission lines near the North Madison and Huiskamp substations, State Highways 19 and 113, numerous county highways, town and city roads, and the Wisconsin and Southern Railroad. Local electric distribution lines follow STH 19 and STH 113, and many of the county highways, town and city roads. Local electric distribution lines also traverse cross-country. In addition to investigating the above, ATC also investigated new cross-country corridors, generally following existing features such as field and section lines, to minimize landowner impacts. In general, cross-country route corridors were chosen for evaluation where they would reasonably intersect with higher priority corridors.

For this Project, there are no ideal corridor-sharing options. When considering corridor-sharing with existing transmission lines related to this project, (the 138 kV North Madison to West Middleton, 138 kV North Madison to Sycamore, 69 kV North Madison to Dane, 69 kV North Madison to DeForest, and 69 kV Dane to Waunakee), extended lengths for these existing double-circuit configuration create longer line outages.

It was found that the benefits of corridor sharing do not outweigh the strain on the ATC system by taking these lines out of service for construction, as well as factoring the cost of energized construction or temporary line construction as alternatives. Further, there will be an increased risk of the loss of the new line and the existing line by the same initiating event, such as a storm (i.e., lack of geographic diversity). For these reasons, double-circuit configurations which added significant length to the overall line length were eliminated.

East of county road WIBU/CTH I and west of Schumacher Road, potential transmission line route corridors were eliminated from consideration due to increased line length, resulting in increased costs with little to no commensurate benefit in minimizing impacts.

Several other segments had varying environmental sensitivities (most notably segment 4) and design considerations (significant rock, excessive tree clearing, etc.) that prompted rejection of those segments.

The Preferred and Alternate Routes selected for presentation in this Application utilize existing road and utility corridors to a major extent, and minimize environmental impacts.

Additional information can be found in Section 2.3 below.

2.2.4 Public Outreach

ATC representatives met with local elected officials and landowners in various forums to present the project need and routing alternatives, and to actively solicit input on the project, area specific attributes (environmental, development plans, etc.) affecting the project, and potential route alternatives. Five public meetings utilizing an open house format were held by ATC at Sweet Sophie's Restaurant and Hall in Waunakee to present information on the project, alternatives, potential routes and impacts. Invitations sent to the local populace for the meetings also solicited written input. A copy of a typical meeting invitation is provided in Appendix F. Meetings were held on:

- June 28 and 30, 2005, to introduce the project to the public, including project need and possible route corridors identified by ATC.
- September 22, 2005, to present the preliminary ATC routing analysis and two potential routes identified by ATC for further analysis and development.
- October 20, 2005, to provide an additional opportunity for people living in the Savannah Village area to review all aspects of the proposed project.
- December 6, 2005, to review the two proposed routes that ATC intended to include in its application.

Additional meetings were held with various members of the public, local organizations and public officials. Input, both written and oral was documented and considered by ATC in selecting routes for the proposed project. A chronology of ATC's outreach and communications with the public is provided in Appendix F along with copies of all invitations and informational mailings. Input received at the first two rounds of public meetings and other written feedback received outside these meetings is also documented in Appendix F.

2.3 GENERAL TRANSMISSION LINE SITING INFORMATION

The project area, including identification of potential route corridors and the Preferred and Alternate Routes, is shown on the project area map provided as Appendix A, Figure 2. Appendix A also includes the following:

- Figures identifying zoning and land-use along the Preferred and Alternate Routes (Figures 5 and 8);
- Federal Emergency Management Agency floodplain information (Figure 10);
- The land use plans for the area are attached as Figure 11;

- Plat maps, Figure 12; and
- Topographic maps, Figure 7.

Appendix A includes aerial photography, Wisconsin Wetland Inventory data overlaid on aerial photography and USGS topographic maps.

Digital data files including digital versions of aerials suitable for importing into a GIS program are being provided for staff use.

The Preferred Route exits the North Madison Substation to the east and follows the existing North Madison to Sycamore 138 kV line to county road WIBU. The line will then turn south and follow county road WIBU, across CTH V (introducing one mutual structure with the North Madison to DeForest 69 kV line), and continue south along CTH I until it reaches Easy Street. At Easy Street, the line will turn west, staying parallel to CTH I, and ultimately follow CTH I to the south again, to STH 19. The line will cross STH 19 and parallel STH 113, heading south to West River Road. At West River Road, the line will turn west until intersecting the Wisconsin and Southern Railroad/Waunakee to Huiskamp 69 kV line, where it will turn south, and become double circuit into Huiskamp Substation.

The Alternate Route also exits the North Madison Substation to the east for one span, turns south for one span, and then turns west until intersecting Patton Road. The common exit to the east for both the Preferred and Alternate routes reflects the vacant exiting location. Turning south, the line will parallel Patton Road, cross CTH V (introducing one mutual structure with the North Madison to DeForest 69 kV line) to Cuba Valley Road, where it will go west to Schumacher Road. At Schumacher Road, the line will travel south, cross STH 19, parallel Raemisch Road to the south, and then turn west at the intersection of Raemisch Road, Uniek Drive and Foundation Circle. At the end of Foundation Circle, the line will turn south and parallel an active railroad spur until intersecting the Wisconsin and Southern Railroad/Waunakee to Huiskamp 69 kV line, where it will turn south, and become double circuit into Huiskamp Substation.

2.4 DETAILED ROUTE INFORMATION

The potential impacts resulting from the construction of a new transmission line along the Preferred and Alternate Routes are discussed and quantified below.

2.4.1 General Route Impacts

The general impacts of constructing the proposed transmission line along the Preferred and Alternate Routes have been quantified and are presented in the tables in Appendix A. The results of the impact analysis are described below.

2.4.1.1 New Right-of-Way (ROW)

New transmission right-of-way is required for approximately 90% of the Preferred Route and 75% of the Alternate Route. However, in both cases, nearly all of the transmission line ROW would share existing road or distribution line corridor.

2.4.1.2 Existing Transmission Line Right-of-Way

Segments 1 and 36 (approximately 9%) of the Preferred Route and Segments 27, 31, 34, and 36 (approximately 24%) of the Alternate Route would be constructed on existing transmission line ROW.

2.4.1.3 Corridor Sharing

Along both the Preferred and Alternate routes where an existing transmission line does not exist, ATC expects that a new line would be placed on a combination of private property and road ROW. In either case, new easement rights on private property would be necessary for the transmission line in order to accommodate access to the ROW and structures, and maintain necessary clearances to buildings, trees and other obstructions.

Generally, where new easement rights are required adjacent to road ROW, ATC expects the corridor to be 80 feet in width and the centerline to be placed approximately five feet onto private property. This will require approximately 45 feet of transmission line easement rights on private property. In some cases, the transmission line centerline may be placed within the road ROW in order to avoid environmental and/or other impacts. However, such placement of structures within the road ROW will only occur where:

- Sufficient space exists between the “clear zone” between the edge of the outside traffic lane and the edge of the ROW (as determined by the WisDOT).
- There is no conflict with existing structures and other obstructions within and adjacent to the road ROW.
- There are no environmental constraints (e.g., wetlands, streams, or archeological resources)
- There are no conflicting easements or other legal restrictions in existence.
- There are no landowner concerns.

In instances where transmission structures can be located within the road ROW, the need for easement rights on private property may be reduced according to the location of the structure with respect to the

edge of the private parcel boundary. Such reductions would be determined on a case-by-case basis.

Segments 9, 14, 26, 32, 35, 47, 49, 56, and 58 (approximately 85%) of the Preferred Route and Segments 2b, 3, 8b, 13, 24, 43a, and 45 (approximately 68%) of the Alternate Route would be constructed along public roads.

2.4.1.4 Land Use and Zoning

The Preferred and Alternate Routes are located in Dane County, Wisconsin, in portions of the town of Vienna, town of Westport, and village of Waunakee. Land use, zoning, and ownership information is presented in Appendix A, Figures 11,8, 9a, and 9b, respectively.

Length estimates of forested land, wetlands, uplands, and agricultural lands along each route segment were calculated based on 2000 and 2005 aerial photographs and field observations. Dane County's most recent zoning information was used to quantify the extent of residential and commercial/industrial land use associated with each route segment as well as to determine the extent of ownership types. Structure locations were identified using the 2000 and 2005 aerial photography and the structure types determined, as precisely as possible, through field observation from public roads and ATC's existing transmission line ROW.

The Preferred Route would run across land that is presently dominated (approximately 56%) by agricultural use for row crops, hay, and pasture. Another approximately 43% of the Preferred Route is non-agricultural upland such as fallow fields and brush. Approximately 4% of the Preferred Route would cross commercial/industrial land, 1.5% would cross residential land, and 1% would cross wetland. Approximately 150 feet of the Preferred Route is presently in municipal ownership. No forested land occurs along the Preferred Route centerline but is located on the fringes.

The Alternate Route would run across land that is presently dominated (approximately 61%) by agricultural use for row crops, hay, and pasture. Another approximately 30% of the Alternate Route is non-agricultural upland such as fallow fields and brush. Approximately 7% of the Alternate Route would cross commercial/industrial land, and 7% would cross wetland. Approximately 4% of the Alternate Route is presently in municipal ownership, and 51 feet would cross land presently zoned as residential. No forested land occurs along the Alternate Route centerline but is located on the fringes.

2.4.1.5 Buildings

The number of buildings at various distances from the Preferred and Alternate Route centerlines was quantified using GIS then field verified to the extent possible from public roads and ATC's existing ROW. Buildings were tallied according to five distance categories from the centerline: 0 – 25 feet, 26 – 50 feet, 51 – 100 feet, 101 – 150 feet, and 150 – 300 feet. The results of the building survey are summarized in Appendix A Table 1 (residential) and Table 2a (business and agricultural). Brief descriptions of the results are also provided below.

2.4.1.5.1 Homes

On the Preferred Route, residences were found within 300 feet of the centerline along all segments except 36, 56, and 61. Residences were fairly evenly distributed along those segments where they occurred and only segment 26 had a residence closer than 50 feet from the centerline.

Along the Alternate Route, residences were found within 300 feet of the centerline along segments 2b, 3, 8b, 13, 27, 31, and 43a. A majority of the residences were found along segments 31 and 43a. None of the residences found along the Alternate Route was closer than 50 feet from the centerline.

2.4.1.5.2 Apartments

No apartment complexes were observed within 300 feet of the centerline of any segment along either the Preferred or Alternate Route.

2.4.1.5.3 Schools

No schools were observed within 300 feet of the centerline of any segment along either the Preferred or Alternate Route.

2.4.1.5.4 Daycare Centers

No daycare centers were observed within 300 feet of the centerline of any segment along either the Preferred or Alternate Route.

2.4.1.5.5 Hospitals

No hospitals were observed within 300 feet of the centerline of any segment along either the Preferred or Alternate Route.

2.4.2 Impacts by Land Type

Appendix A, Table 2a, shows length and area figures by route segment of the necessary easement widths required to construct the proposed transmission line along the Preferred and Alternate Routes. For segments

along roads and highways, the calculations are based on the route centerline being placed approximately 5 feet onto private land outside the road ROW.

2.4.2.1 Agricultural

Both the Preferred Route and Alternate Route would run across land that is presently dominated by agricultural use for row crops, hay, and pasture. Approximately 56% of the Preferred Route centerline and 61% of the Alternate Route centerline crosses agricultural land. Additional discussion is presented in Section 2.4.4 below.

2.4.2.2 Forested Lands

Neither the Preferred Route nor the Alternate Route centerline would cross forested lands although some amount of ROW on both routes would overlap the edge of forested lands. Additional discussion is presented in Section 2.4.5 below.

2.4.2.3 Wetlands

Approximately 1% of the Preferred Route and 7% of the Alternate Route would cross wetland. Additional discussion is presented in Section 2.4.12 below.

2.4.2.4 Upland

Lands falling within this classification include uplands exclusive of agricultural, forest, and developed land (e.g., road, road ROW, residential properties). Approximately 42% of the Preferred Route and 33% of the Alternate Route centerline would cross land classified as upland.

2.4.2.5 Federal Land

Neither the Preferred nor Alternate Route would cross any federal land nor were any federally owned lands identified within 300 feet of the centerline of either the Preferred or Alternate Routes. (Lands owned by the US Fish and Wildlife Service lie approximately 800 feet to the west of the Alternate Route Segment 3).

2.4.2.6 State Properties

Neither the Preferred nor Alternate Route would cross any state land nor were any state owned lands identified within 300 feet of the centerline of either the Preferred or Alternate Route.

2.4.2.7 County-Owned Land

Neither the Preferred nor Alternate Route would cross any county-owned land. However, along Segment 13 Dane County parkland lies

across Schumacher Road approximately 100 feet to the west of the Alternate Route centerline.

2.4.2.8 Town, Village, City, or Other Publicly Owned Land

Municipal lands occur along Segment 47 of the Preferred Route (Vienna Town Hall) and Segments 24, 27, and 31 of the Alternate Route. The total crossing length for the Preferred Route and Alternate Route centerlines are approximately 150 feet and 2000 feet respectively. A majority of the municipal land along the Alternate Route lies within the Industrial Park along Raemisch Road.

2.4.2.9 Native American Indian Reservations

No Native American Reservation land was identified within 300 feet of the centerline of either the Preferred or Alternate Route.

2.4.2.10 Residential Land

Land zoned as residential occurs along segments 9, 14 and 26 of the Preferred Route (745 feet), and segment 43a of the Alternate Route (51 feet). Although zoned residential land is minimal, scattered residences occur along both routes as described in Section 2.4.1.5.1 above.

2.4.2.11 Commercial/Industrial Land

Along the Preferred Route, the centerline crosses approximately 1,800 feet of land zoned as commercial/industrial along segments 35 and 36. Along the Alternate Route, the centerline crosses approximately 1,250 feet of land zoned as commercial/industrial along segments 27, 34 and 36. Another approximately 1,750 feet of land zoned as municipal but developed for industrial/commercial occurs along the Alternate Route within the Industrial Park along Raemisch Road.

2.4.3 Route Summaries

Data quantifying the following is presented in Appendix A, Table 3:

- the approximate linear crossing distances and acreage of each route;
- their degree of corridor sharing;
- residence, business, and farm operation locations; and
- area of different land types.

In general, the Preferred Route is slightly shorter than the Alternate Route, has less commercial/industrial area, less forested land, and would have substantially less wetland crossing. The Alternate Route has about the same number of residences, about a third fewer farm operations, and

would require somewhat less new ROW than the Preferred Route. Both routes have approximately the same length of corridor sharing and abundance of agricultural and other upland land types.

2.4.4 Agricultural Land

Agricultural land uses were identified using the 2000 and 2005 aerial photography and verified through field observation from public roads and ATC's existing transmission line ROW. Property classified as being in agricultural use includes active fields, orchards, and pastures. Fallow fields with no evidence of tillage on both the 2000 and 2005 aerial photography and during the field review were not included as agricultural land. The amount of agricultural acreage along both the Preferred and Alternate routes was calculated by creating a land-type GIS layer based on the aerial photography and field observation, clipping it with an 80-foot-wide route corridor, calculating the acreage of each resulting polygon, and summing the acreages of each land type by segment. A summary of this analysis is presented in Appendix A, Table 2b.

2.4.4.1 Type of Farming

The primary farming practice along both routes is row crops, generally corn and soybeans. Pasture and hayfields also occur to a lesser extent. Because the majority of each route is along shared ROW and farming will be allowed as part of the easement, impacts to existing farming practices should be minimal.

2.4.4.2 Practices Potentially Affected

The potential agricultural impacts of the proposed project include temporary construction-related impacts such as loss of crops, long-term impacts such as less efficient tillage and potential loss of acreage due to structure placement.

In general, access to structure locations will be along existing public road ROW that parallels the proposed corridor. However, in some instances, equipment may need to travel across presently-cultivated land in order to access pole locations. Equipment travel across farmed areas may result in soil compaction and crop damage. The timing of construction will be coordinated, if possible, to occur during times such as the winter or non-growing season in order to minimize or avoid impacts. ATC will use the access routes and methods that appear to minimize the potential impacts to agricultural lands and practices. Landowners will be compensated for crop and other damages arising from construction activity.

All route segments in agricultural areas run along public road ROW and the proposed structures would be located along the edge of the ROW

and the farm field. This placement practice should minimize the loss of tillable land and any problems associated with use of agricultural equipment.

No clear evidence of drain tile along either the Preferred or Alternate Route is apparent from aerial photography nor was evidence of tile lines observed during the field investigation. If tiles do exist along the selected route, breakage from construction vehicle travel may occur. If this occurs, ATC will restore the tiles to pre-construction conditions.

No parcels with spray irrigation systems were observed on aerial photography or during the field investigation however, a landowner at the intersection of HWY 113 and the west side of CTH I indicated that they employ a crop duster and helicopter for aerial spraying to pollinate their seed farm.

2.4.4.3 Farmland Preservation Program Parcels

According to the Wisconsin Department of Agriculture, Trade and Consumer Protection, none of the parcels lying along either the Preferred or Alternate Route are presently enrolled in the Farmland Preservation Program.

2.4.5 Forest Land

Forested lands were identified using the 2000 and 2005 aerial photography and verified through field observation from public roads and ATC's existing transmission line ROW. Forested lands were defined as areas dominated by trees (> 20% canopy cover) within 75 feet of the ROW centerlines and running at least 75 feet along the ROW.[2]

Neither the Preferred nor Alternate Route centerline would run across lands that are presently forested. Nearly all of each route consists of agricultural land, road ROW, or other land that has been previously cleared. However, portions of each route's proposed ROW do overlap forested land in several places. Identified areas are summarized in Appendix A, Table 2b.

The areas of forested land along the Preferred Route ROW occur in Segments 47 and 49. Along the Alternate Route ROW, forest land occurs primarily in Segments 3 and 43a. Forested area also occurs adjacent to the existing transmission line ROW in Segment 31. The forested areas near the proposed ROW in Segments 3, 31, 43a, 47, and 49 consist

[2] The 75-foot figure is a more conservative figure than the 5-acre minimum size defined in the US Forest Service Silvicultural Handbook (FSH 2409.26d), and the canopy coverage is based on the EPA, NRCS, and USDA guidelines for defining land cover (http://www.epa.gov/mrlc/Implmnt_plan.htm#Def).

primarily of smaller box elder, cottonwood, red oak, shagbark hickory, and bur oak trees. Large bur oak trees dominate the forest edge in Segment 43a of the Alternate Route.

In instances where forest land occurs, tree removal would be required in the portions of these woodlots that extend into the proposed easement area for the route. Low-growing woody vegetation would only need to be removed at locations where transmission line structures would be installed and to provide access for construction equipment. In such areas, shrubs and other low-growing vegetation would be allowed to reestablish after construction was completed.

2.4.6 Conservation Easements

According to information provided by the Natural Resource Conservation Service (NRCS), lands with federal conservation easement agreements, such as the Wetland Reserve Program (WRP) or the Grassland Reserve Program (GRP), do not occur along the route segments for this project. Other conservation easements were not identified along the routes.

2.4.7 Endangered, Threatened, or Special Concern Species, and Natural Communities

Information concerning the presence of rare species (threatened, endangered, or special concern) within two miles of the Preferred and Alternate Routes was obtained through a review of the Wisconsin Natural Heritage Inventory (NHI) database. The NHI database notes the presence of three historic and twenty non-historic occurrences of threatened, endangered, or special concern species, and nine occurrences of natural communities within two miles of the Preferred and Alternate Routes. ATC, with its consultant, Graef, Anhalt, Schloemer & Associates, Inc. (GASAI), reviewed the habitat requirements of the non-historic NHI species listings and compared them to habitat occurring along the Preferred and Alternate Routes.

None of the non-historic NHI records for Threatened, Endangered, or Special Concern species overlaps with either the Preferred or Alternate Route corridors and none of the fifteen species were observed along either route during the field investigation. However, eight of the species were deemed to have at least marginal habitat along one or both of the route corridors.

Since the Preferred and Alternate Routes tend to run through agricultural land and follow road edges, which are subject to frequent disturbance, observed habitat quality was generally poor. Consequently, the risk of direct impact to any of the species identified within two miles of the proposed project or substantial indirect impact to their suitable habitat

from construction of the proposed transmission line appears minimal. The risk is minimal because most of the route corridors have already been developed and therefore do not contain suitable habitat. Once a route has been selected, ATC will survey the areas with potentially suitable habitat and implement avoidance measures if a species is subsequently identified. ATC's standard construction techniques and construction timing should result in minimal ground disturbance, and the change to existing habitat conditions from the resulting poles and wires would be negligible.

A report describing the methods and results of the endangered, threatened, and special concern species investigation was submitted to the WDNR Office of Energy for review and comment and to the Commission concurrent with its submittal to the WDNR.

No designated State Natural Areas are located in the vicinity of either the Preferred or Alternate Route corridors.

2.4.8 Archaeological and Historic Resources

Great Lakes Archaeological Research Center, on ATC's behalf, has conducted an archival and literature review of the project area, included in Appendix E, Exhibit-2. This report identified seven archaeological sites near the Preferred or Alternate Routes. One of these sites is a historic Euro-American cemetery. However, ATC is proposing that the transmission line be located on the opposite side of CTH I from the cemetery. Upon final line design, further archaeological review will be undertaken to ensure that these identified sites are properly protected.

2.4.9 Nearby Airports

A privately-owned and operated airfield is located west of Division Street in the village of Waunakee and influences segment 27 of the Alternate Route. The airfield is used as a private residential airport.

A second airport is a publicly owned, public use airfield located approximately 5 miles northeast of the city of Madison and influences segments 35 and 61 of the Preferred Route. The airfield is used by commercial and general aviation air traffic.

It does not appear that height limitations will have any impact on typical structure heights. See Appendix A, Figure 13 for a map showing the height restrictions.

Airfield ownership and other information as listed by the FAA and WisDOT Bureau of Aeronautics are provided below:

Name	Location Section Number Township/Range Latitude Longitude	Owner Name	Manager Address
Waunakee (6P3)	Section 8 T8N R9E 43º 10' 43.4" N 89º 27' 4.6" W	Waunakee Airpark, LLC	Jerome Ripp 1113 So. Division St. Waunakee, WI 53597
Dane County Regional – Truax Field (MSN)	Section 20 T8N R10E 43º 08' 23.488" N 89º 20' 15.049" W	Dane County	Bradley Livingston 4000 International Ln. Madison, WI 53704

Permits from the FAA or the Bureau of Aeronautics are not expected to be needed for the construction of the proposed line. Any required notifications to the agencies will be made.

2.4.10 Access Issues

All segments of the Preferred and Alternate Routes, except for small portions of Segments 35 and 24, run along public roads and/or transmission lines. For all segments ATC is proposing to directly access the ROW from public roads unless the construction contractor hired by ATC is able to arrange for alternative access that minimizes environmental impacts. A preliminary access plan showing access in remote areas containing wetlands or waterways for each of the two routes is presented on Figure 14a and 14b of Appendix A. Upon approval of a transmission line route, the preliminary access plan may be amended based on negotiations with local landowners and or contractor requirements.

Access methods may include the use of ice roads, dry or frozen conditions, low ground pressure equipment, or construction mats. The goal of these alternative construction access methods is to prevent or minimize the temporary construction-related ground disturbances in order to reduce the potential for creating conditions that would be conducive to introducing non-native plants or disrupting desirable plant communities.

2.4.11 Waterway Permitting Activities

A summary of all waterways intersecting the Preferred and Alternate Routes is presented in Appendix E, Table 1.

For the Preferred Route, ATC anticipates needing permit approval (*Wis. Stat.* § 30.123) to temporarily cross one stream along Segment 35. The stream occurs within a wetland and is approximately 12 feet wide with moderately sloping vegetated banks. ATC will work with private landowners to identify alternate access routes. However, ATC has requested the issuance of a permit for this crossing in the event that avoidance is not possible. Other temporary stream crossings along the Preferred Route would not be required because they can be avoided by access from either side of the stream or by going around on existing travel routes.

Construction along the Alternate Route would require seven temporary stream crossings along Segments 27 and 31, adjacent to the railroad track and Six Mile Creek. Some of these crossings may not be required if ATC is able to secure alternate access via private landowners.

2.4.12 Wetlands and Wetland Crossings

2.4.12.1 Wetland Delineation

ATC's environmental consultant, GASAI, completed a wetland investigation along the Preferred and Alternate Routes. Initially, during potential route evaluation, methods combining elements of the 1987 *Corps of Engineers Wetlands Delineation Manual* (Corps Manual) approach for off-site routine investigations and the Natural Resources Conservation Service (NRCS) approach for evaluating remote sensing data were used to determine the presence of water features and identify approximate boundary locations on aerial photography.

Once the Preferred and Alternate Routes had been determined, field-based wetland delineations were carried out along both routes between September 14 and 21, 2005. Methods outlined in the Corps Manual for routine delineations and related guidance documents were used to determine the presence of wetlands and to identify boundary locations. Identified wetland boundaries were located with flagging and recorded with a sub-meter-accurate GPS unit.

Wetlands identified during the investigation are shown on Figure 14a and 14b of Appendix A.

2.4.12.2 Remotely Identified Wetlands

During the field delineation, the apparent locations of wetland boundaries extending outside the study corridor were sketched onto aerial photographs in the field. This information, along with data from the preliminary off-site study was used to determine the location of some wetland boundaries outside the areas where access was available during the field portion of the wetland investigation.

2.4.12.3 Wetland Crossings

Several wetlands occur along both the Preferred and Alternate Routes that would need to be crossed during transmission line construction unless alternate access routes can be identified upon final route approval. A preliminary access plan specific to remote areas containing wetlands or waterways is discussed in Section 2.4.10 and provided on Figure 14a and 14b of Appendix A.

Based on preliminary route designs, it appears that four structures along the Preferred Route and eight structures along the Alternate Route would need to be placed at least partially in wetland. In addition, access through several wetlands would be required in order to access pole locations. The structure locations and anticipated wetland crossings are summarized in Appendix E, Table 2. Upon approval of a corridor, ATC and its contractors will attempt to minimize wetland impacts during final route design and access planning.

2.4.12.4 Sensitive Wetlands and Areas of Special Natural Resource Interest

All of the wetlands identified along the Preferred and Alternate Routes are dominated by reed canary grass (*Phalaris arundinacea*) and all had Floristic Quality Index scores less than 20. The highest quality wetlands from a floristic quality and functional standpoint are those along Six Mile Creek corridor crossed by the Alternate Route.

None of the water bodies along the Preferred Route is a designated water or, based on field review, appear a sensitive resource.

The WDNR lists two water bodies associated with the Alternate Route corridor as designated waters. The first of these is an unnamed water body less than 50 acres along Segment 43a. The other is Six Mile Creek, which is designated as an *Exceptional Resource Water*. Therefore, the wetland fringe of the pond along Segment 43a and wetlands W-A4 and W-A5 along Six Mile Creek are Areas of Special Natural Resource Interest (ASNRI). ATC also considers the wetland along Segment 3 a sensitive resource because it is connected hydrologically and functionally to the wetland complex in the United State Fish and Wildlife Service (USFWS) preserve to the west.

The proposed transmission line construction would not result in any conversion of wetland types and application of Best Management Practices along with ATC's standard environmental protection procedures should avoid and minimize wetland impacts as much as possible.

2.4.13 Mapping Wetland and Waterway Crossings

The centerline of the Preferred and Alternate Routes are shown on 2005 aerial photography in Appendix A, Figures 6a and 6b respectively.

The centerline of the Preferred and Alternate Routes are shown on USGS topographic mapping in Appendix A, Figure 7.

Refer to Appendix A, Figures 14a and 14b for recent aerial photographs overlaid with the following features: transmission line, ROW, waterways, WWI, delineated wetlands, hydric soils, proposed temporary bridge locations, and locations of proposed access routes through remote areas containing wetlands or waterways.

2.5 CONSTRUCTION METHODS

2.5.1 General Construction Information

The following discussion is related to ATC specifications used in overhead transmission line construction. See Section 2.6.7 for additional discussion related to substation construction.

2.5.1.1 Type and Location of Structures

The proposed transmission line will primarily be a single-circuit 138 kV line. See Section 2.1.2 for a description of the expected structure type to be used for various segments of the transmission line route depending on the route chosen by the Commission.

Steel structures are preferred due to the proposed span lengths. Where steel structures are used, they may be galvanized or weathering steel depending on structure location (such as rural or industrial locations) and local preference.

The structure configuration would be identical for either wood or steel pole types. The cost of a typical 75-foot-tall, tangent, 138 kV single-circuit pole structure with braced-post insulators and no distribution underbuild with the required load carrying capability is approximately equal for wood or steel.

The Preferred Route has approximately 66% of the route with overhead distribution, and approximately 70% the designed structures being a tangent type design (where structure alignment is essentially a straight line). Large quantities of wood poles at 95 feet and greater length, as would be typical with distribution underbuild, are difficult to procure. Steel poles would most likely be the preferred structure selection for the taller structures used in distribution underbuild situations.

In general, wood poles require guy-anchor assemblies to be installed on structures for support with line angles greater than one degree. For medium and large-angle structure locations, wood or steel can both be considered for these situations by installing either guy-anchor assemblies for wood or concrete foundations for steel structures. A guyed wood pole requires a larger easement area than does a pole with a concrete foundation. This area is typically greater than the proposed right-of-way width. In agricultural areas, guy-anchors can be potential obstacles for farm equipment to maneuver around. In urban areas, guy-anchors may be impractical due to space limitations and aesthetic reasons. It should be noted, however, that the additional ROW cost to accommodate guying is usually more cost-effective than the steel pole cost on concrete foundation. It is anticipated that a combination of guy-anchor steel and concrete foundations will be used.

2.5.1.2 Existing Structures

Existing structures will not be used as the proposed line is a new transmission line. Some existing structures on existing ROW will be removed and replaced with taller or larger load-carrying structures. See Section 2.1.1 for the locations of existing structure replacement.

2.5.1.3 Structure Construction

In general, single-circuit tangent structures are expected to be direct embedded light-duty steel poles. Although unlikely, some tangent structures may require foundations depending on the soil conditions and structure loading. Double-circuit tangent structures will also be light-duty steel, and are anticipated to be direct-buried. However, some may require concrete foundations.

Single-circuit angle structures will be self-supporting steel poles on concrete foundations, depending on the final structure design. Double-circuit angle structures will be steel poles and will require concrete foundations.

2.5.1.4 Structure Foundations

The method of installation, diameter and depth of the excavation will vary depending on the soil capability and structure loadings. Excavation is required for all structures whether direct embedded or requiring a foundation. The depth of the excavated hole and, therefore, the amount of excavated material is dependent on the soil conditions encountered at the proposed structure location. Excess soils from excavations in uplands may be spread in the ROW and stabilized (seeded and/or mulched) or hauled to an offsite disposal location depending on property owner's requirements. In any area where

conditions may be conducive to erosive losses, (erodable soils, slopes, wetlands or streams adjacent to site) appropriate erosion control measures as described in the WDNR Construction Site Best Management Practices will be installed and maintained until final restoration and revegetation is complete.

For direct-embedded poles (no foundation required), a hole is excavated to the appropriate depth. The base of the structure is placed into the excavated hole, and the area around the pole is backfilled with clean granular fill (typically gravel) to within one foot of the surface. The balance of the excavation is backfilled with native soils.

For structures requiring a foundation, the required hole is excavated. Concrete caissons are formed using a rebar and a bolt cage and placed into the excavation. The excavation is then filled with concrete to a point where the bolt cage is covered leaving the bolts exposed. The complete caisson is allowed to cure for approximately one week to develop necessary strength. After the caisson is cured, the angle structure is mounted to the caisson using the exposed bolts. In general the excavated holes will range from 4 to 10 feet in diameter and may be 15 to 30 feet in depth.

If poor soil conditions are encountered such that direct embedment or a concrete foundation is not practicable, the method of structure installation will utilize vibratory methods. At locations where vibratory techniques are used, the upper four feet of soil is removed by use of a backhoe and transported to an approved upland location for disposal or dispersal. A steel caisson up to approximately 60 feet long is then advanced (buried) using vibratory methods. When the caisson has been fully advanced, a platform is bolted on to the caisson. The base of the steel transmission structure is mounted to the platform.

2.5.1.5 Construction Equipment

Construction equipment normally used in transmission line construction is expected to be used. These include dump trucks, backhoe, drill rigs, cranes and related equipment.

2.5.1.6 Construction Disturbance Zone

Construction will be confined to the ROW and along access routes. ATC will utilize existing roads or ROW, and/or arranged access locations where roadways are not present. Most disturbances will likely occur in the area immediately surrounding transmission line structures. In areas where access cannot be gained from existing roads, some disturbance from vehicular traffic may also occur. Disturbance at these

areas will include clearing of vegetative cover, soil compaction, vehicular tracking, and some topsoil disturbance.

2.5.1.7 Construction Methods

Based on the project schedule, ATC anticipates performing construction along a portion of the route during the winter months. Particular emphasis will be made to construct in environmentally sensitive areas during the winter, if possible. Transmission line construction during winter months helps minimize impacts to the environment. Depending on weather and ground conditions (frozen, snow cover, etc.) at the time of construction, the method of access will be chosen to minimize temporary ground disturbance caused by the construction as described in Section 2.4.10.

2.5.1.7.1 Agricultural Areas

Agricultural areas commonly occur along both routes. In these areas, ATC will use general upland construction procedures utilizing standard construction equipment. These construction practices will conform to Best Management Practices to minimize environmental impact (e.g., soil erosion). ATC will strive to access structure locations using the route or method that will minimize impacts to agricultural land to the extent practicable (e.g., utilizing field edges). To further avoid agricultural impacts, construction will be conducted in winter, if possible. Landowners will be compensated for crop and other damages arising from construction activity consistent with the terms in the property easements.

ATC will work with potentially affected agricultural landowners to ensure that farm disease mitigation currently practiced by the landowners will be adhered to during construction of the transmission line. If an agricultural landowner has no such practices in place, ATC will work with the landowner to develop farm disease mitigation practices for the particular type of agricultural operation, if requested by that landowner.

Costs associated with farm disease mitigation practices vary widely depending on the practices employed. The most simple, and least expensive, method to minimize the potential for impact could be to isolate the property within the proposed easement and remove it from agricultural production through the period of construction activity. Compensation could be offered to the agricultural landowner for not producing a crop or spreading manure.

More involved and expensive options include the use of cleaning stations to clean equipment when moving between agricultural

operations. Dry, high pressure air cleaning stations are estimated at approximately $14,000 per station, and high-pressure water washing stations are estimated to cost approximately $15,000 per station. Construction down time for use of cleaning stations during all phases of construction including clearing, foundations, structure hauling assembly and erection, wire stringing and restoration activities will add additional cost which would vary depending on the number of structures between cleaning stations. The need for and location of the cleaning stations would be determined during discussions with each landowner.

Costs for implementation of appropriate farm disease mitigation practices have not been included in section 2.1.7 of this Application as discussions with landowners have not occurred that would determine the practices to be employed. If the Commission approves this Application, ATC will work with the agricultural producers on the chosen route to implement appropriate farm disease mitigation practices to minimize the potential for agricultural impacts. If necessary, project cost estimates will be revised to reflect the additional costs

2.5.1.7.2 Forest Lands

Clearing of tall-growing vegetation and brush within the right-of-way will be required to facilitate the safe and efficient construction, operation, and maintenance of the transmission line. Vegetation will be cut at or slightly above the ground surface. Root stocks will be left in place to regenerate after construction, except in areas where stump removal is necessary to facilitate the movement of construction vehicles along the ROW. Re-growth of tall-growing species under the transmission line will not be allowed. Where permission of the landowner has been obtained, stumps of tall-growing species will be treated with an herbicide to discourage re-growth. The disposition of trees of commercial or other value will be negotiated with the landowner prior to the commencement of land clearing and included in the easement agreement.

2.5.1.7.3 Surface Waters and Wetlands

Construction activities typically will not take place on the stream banks or close to the water, other than cutting or trimming trees that exceed the maximum height limit. In-stream use of heavy equipment will not be required on this project.

<u>Waterways</u>

To the extent practicable, temporary stream crossings will be avoided by utilizing existing culverted crossings or by accessing riparian areas from nearby roads on either side of a stream. Where necessary and authorized by the WDNR, Temporary Clear Span Bridges (TCSBs) will be placed to avoid in-stream disturbance (See Section 2.4.11 for anticipated locations of TCSBs). Each TCSB will consist of construction mats placed to span the stream bank. Preparation for setting the bridge may include minor blading and excavation confined to the minimum area necessary for safe mat installation. Removal of trees, shrubs, and other shoreline vegetation will be kept to a minimum. Proper erosion control measures will be implemented and maintained during and after the utilization of the temporary crossing. Access roads will not need to be constructed to install these bridges.

Wetlands

No temporary or permanent fill placement is proposed for wetland access routes. When wetland access is required, disturbance to wetlands will be reduced by implementation of several specialized construction techniques, which may include timing wetland construction during dry or frozen conditions and the use of low ground pressure tires, specialized track vehicles, and/or matting materials to help minimize soil and vegetation disturbances. Large foundation auguring equipment, heavily loaded trucks, cranes, and specialized line construction equipment must access structure locations. If necessary, pre-fabricated construction mats would be used to spread the concentrated axle loads from this equipment over a much larger surface area thereby reducing the bearing pressure on fragile soils.

2.5.2 Underground Construction

No underground transmission line construction is proposed as part of this project. All proposed transmission lines will be above ground.

A number of the transmission line route segments are located along road right-of-way with existing overhead distribution lines. Due to the increased height of the transmission structures with distribution under-build, some distribution lines may be converted to underground distribution. Based on cost estimates provided by the affected distribution companies, it may prove cost-effective to locate single-phase distribution circuits underground.

2.5.3 Waterway Crossings

2.5.3.1 Method of Crossing

Temporary clear span bridges (TCSB) are proposed to cross streams as identified in section 2.4.11 and Appendix E, Figures 1-4. A drawing of a typical crossing method, and photographs of the crossing locations are also provided in Appendix E. Refer to Section 2.5.1.8.3 for a further discussion of TCSB crossing methods.

2.5.3.2 Upland Excavations

Except for minor blading that may be required to properly stabilize the bridge, upland excavation is not anticipated to be required for the waterway crossings.

2.5.3.3 Temporary Crossing Construction and Access

Temporary Clear Span Bridges will be required to cross one waterway along the Preferred Route, and seven waterways along the Alternate Route. Refer to Section 2.5.1.8.3 for a discussion of crossing methods.

2.5.3.4 Underground Crossing Construction

The proposed transmission line will be constructed above ground. No underground crossings will be constructed.

2.5.4 Wetland Crossings

2.5.4.1 Crossing Method

Wetlands occur along the Preferred and Alternate Routes. Access through many of these wetlands will be required during transmission line construction. The locations and access within these wetlands is discussed in Sections 2.4.10 and 2.4.12.

The following summarizes construction techniques that will be utilized for crossing wetlands.

<u>CT-2: Unstable Soil Conditions</u>

If saturated or unstable soil conditions exist at a construction location, several construction techniques may be implemented to reduce the effects on wetland soil structure and dependent functions, including hydrology and the wetland's capacity for re-vegetation of native species. These techniques include the use of the following: the use of ice roads, construction mats, low ground pressure or tracked vehicles in areas where the soils are saturated or not frozen, and TCSB installed in wetlands that contain cross-cut channels.

<u>CT-3: Stable Soil Conditions</u>

If the wetland to be crossed has drier, stable, and cohesive soils or is frozen, construction will proceed in a manner similar to upland construction. If the wetland soils are not saturated at the time of construction and can support both tracked and/or rubber-tired equipment, ATC will construct in that area using construction mats only when needed to minimize impacts.

CT-4W: Wire Handling/Stringing - Wetlands

Wire handling and stringing will still be necessary in wetlands where equipment crossing is restricted. This method would be used for wetlands identified as having special resources needing additional protection and where access across the wetland would be available from the existing ROW. For CT-4W wetland crossings, a small tracked vehicle or an all-terrain vehicle may pull the line through the wetland. However other construction traffic will be limited. Construction mats will be used if necessary.

2.5.4.2 Control of Invasive Species

All of the wetlands along the preferred alignments for both routes are dominated by reed canary grass, and cleaning of construction equipment prior to entering these wetlands is not necessary. Further discussion of the floristic quality of these wetlands is provided in Section 2.4.12.4

2.5.4.3 Excavated Materials

For pole placement in wetlands, the estimated area of excavation will range from about 20 to 50 square feet, and the volume of excavated material will range from about 350 to 700 cubic feet, depending upon method of installation (direct embed versus concrete foundation). Material not required for backfilling will be thin spread in an upland area within the ROW or placed in an upland location as directed by the landowner.

2.5.4.4 Site Fill and Dewatering

The only fill required in wetlands for which ATC seeks authorization will be backfilling excavations after structure placement. Fill will not be required in wetlands to provide access.

Dewatering may be necessary at some structure locations, refer to Section 2.5.8 for further discussion of dewatering methods.

2.5.5 Re-vegetation

The need for and approach to site restoration and re-vegetation will be based on the degree of disturbance caused by construction activities and the ecological setting of each site, and will need to reflect and satisfy the

requirements of the property owner. If construction can be accomplished without creating appreciable soil disturbance, restoration may not require re-vegetation efforts. Restoration activities will be implemented following the completion of construction activities. These activities will begin as soon as practical and as allowed by weather conditions.

2.5.5.1 Restoration Plan

The particular ecological setting at any disturbed location will allow ATC to identify the type of restoration and/or re-vegetation that may be appropriate. For example, if construction results in disturbance of a turf-grass sod area, the type of seed mix used for re-vegetation would be different than if the disturbance occurred in a wet meadow community. Re-vegetation in disturbed areas may be facilitated by native seed banks.

2.5.5.2 Post-Construction Monitoring and Maintenance

In cases where there is no sign of re-growth of pre-existing vegetation species in the first month of the subsequent growing season, an appropriate seed will be brought in and properly applied. ATC will monitor the sites that were seeded to ensure growth occurs.

2.5.6 Erosion Control Plan (sites greater than 1 acre)

Land disturbing activities associated with this project include the construction activities at individual transmission structure and wire stringing locations, transport of construction equipment between locations, and vegetative clearing of the ROW. All substation work will involve equipment installation within the existing substation footprint and will not result in additional land disturbance. As the total disturbed area may exceed one acre, ATC will request coverage under the General Permit for Storm Water Discharges Associated with Land Disturbing Construction Activities. The following summary of general erosion control practices will be implemented, and address the applicable portions of Sections 2.5.6.1 through 2.5.6.5.

2.5.6.1 Methods and Materials

Erosion control Best Management Practices (BMPs) will be applied at specific locations, as necessary. Silt fence will be installed on the down slope side of the work area for each location where slope, vegetative cover, and/or the distance to a waterway or wetland is such that the potential for erosion and/or sedimentation impacts exist without such measures in place. Tracking pads will be installed and properly maintained at construction access points that lead off of paved roadways, as necessary based on field conditions. At upland structure locations, spoils will be graded over the surrounding ground surface, or

removed if requested by the landowner; and the area will be reseeded and/or mulched at the earliest suitable opportunity. Temporary stockpiles will be similarly treated or surrounded with silt fence if more appropriate due to location, stockpile duration, etc. Construction matting will be used as necessary to support heavy construction equipment in unstable areas. Excess soils will be removed and deposited in an approved upland location, and disturbed areas will be reseeded and/or mulched at the earliest suitable opportunity.

2.5.6.2 Erosion Control Measure Site Plan

Due to the proposed level of disturbance for construction of the transmission line, an erosion control measure site plan is not considered necessary at this time. Once the route is chosen and final design completed, site-specific information may be provided for those structure locations or access paths deemed to require special consideration along the transmission line route. Erosion control measures will be selected based on site conditions and a range of applicable BMPs rather than a specific erosion control plan dictating exact placement of erosion control measures. It is anticipated that the erosion control plan for the transmission line project will be a decision flow chart based on site conditions, time of year, and nature and length of disturbance.

2.5.6.3 Sequence

Anticipated sequencing for the transmission line construction includes:

- Surveying and Staking of ROW – Requires no erosion control measures
- Development of ROW Access – Silt fence, vehicle tracking pads, and other applicable erosion control measures will be installed as ROW access is gained. Since disturbance of the access path will be intermittent, placement of temporary erosion control measures (erosion control mats, seeding or mulching) of the access path will be performed if the anticipated time interval between disturbance-causing activities is more than one month.
- Temporary Staging and Materials Storage Areas – Staging and storage areas which are constructed and result in ground disturbance will have silt fence placed on the down slope side of the site. If access to the storage area is off a permanent road, a vehicle-tracking pad will be placed at the intersection, if field conditions require.
- Clearing of ROW – Erosion control measures will be in place down slope of the cleared areas that result in ground

disturbance. Areas that will only be cleared and will not sustain further disturbance during the construction project will be permanently restored as necessary (erosion control mats, seeding or mulching) within seven days of the end of clearing operations.

- Structure Site Preparation, Installation, and Wire Stringing – Erosion control measures will be installed down slope prior to structure site preparation if conditions warrant. Since disturbance at structure and wire stringing locations will be intermittent throughout the construction project, temporary restoration (erosion control mat, seed, or mulch) will be completed if the time interval between phases is more than seven days.
- Cleanup and Restoration of ROW – Cleanup and permanent restoration will occur as described in Section 2.5.5.

2.5.6.4 Off-site Diversion Methods

Offsite diversion methods are not applicable to this project as ATC is not planning on diverting water flow.

2.5.6.5 Provisions for Inspection and Maintenance

To insure compliance with regulations and/or project-specific requirements, such as erosion control, qualified ATC staff or its representative will complete routine inspections during construction.

2.5.7 Materials Management Plan

A materials management plan under *Wis. Stat*. ch. 30 and *Wis. Admin. Code* ch. NR 216 will be required for this project. However, a detailed materials management plan cannot be prepared until a route is chosen and final design of the project are complete. The following is a general summary of ATC's materials management practices, and addresses the applicable portions of Sections 2.5.7.1 through 2.5.7.11.

Access to the transmission line ROW for construction and material hauling will be as described in Section 2.4.10.

As discussed in section 2.5.1.7, a final route has not been approved at this time. Therefore a temporary staging area(s) for construction materials has not been identified. Construction materials stored on site generally consist of transmission line structures and cables and related materials and equipment. Upon final route selection, ATC's contractor will work with local landowners to secure areas near the route to temporarily store transmission line construction materials. It is anticipated that equipment and materials required for construction at the substation sites

will be stored at these sites. No equipment storage areas will exist within wetlands or will be placed in an area that requires grading. Vegetation will not be removed to accommodate an equipment staging area unless specifically requested by the landowner.

ATC will require all contractors to have in place a spill control and prevention plan that addresses both the contractor's construction equipment and construction activities.

It is unlikely that contaminated materials will be encountered along either route. If potentially contaminated materials are encountered during construction, ATC will isolate the soils and conduct analytical testing to determine proper disposal of these materials.

No excavation will be completed in stream channels. Wetland excavated materials will either be backfilled in the transmission structure location or evenly spread in an upland area within the ROW. Upland excavated materials will either be backfilled in the transmission structure location or evenly spread in an upland area within the ROW.

2.5.8 Dewatering Plan

At this time, it is unknown if dewatering activities will be necessary. Upon final route selection, geotechnical information that includes depth to groundwater will be collected. ATC will then be able to make some assumptions regarding the necessity to dewater at construction locations. If dewatering is necessary it will be completed as described below and will comply with *Wis. Admin. Code* § NR216. The following is a general summary of ATC's dewatering practices, and addresses the applicable portions of Sections 2.5.8.1 through 2.5.8.8.

The presence of groundwater at or near the ground surface can impact the construction procedures used when boring holes for transmission structures. If groundwater flow into an excavation results in the excavation becoming unstable, it is often necessary to support the walls of the excavation and/or dewater the site. Depending on site conditions and permit requirements, the extracted groundwater is generally discharged to an upland area where it is allowed to re-infiltrate, or to the local storm or sanitary sewer system. Extracted groundwater may also be discharged to a nearby water body if there is no indication of contamination and sediments, and it is free of fines. Water which may contain solids from construction process is most often pumped out of the excavation and trucked either to a treatment facility or to an upland site where it can be allowed to settle and re-infiltrate.

2.6 SUBSTATION INFORMATION

All substation modifications and work activity will be conducted within existing substation boundaries.

2.6.1 Substation Layout

Layout drawings are provided for the North Madison and Huiskamp substations showing the existing and new facilities in Appendix B, Figure 3 and Figure 4, respectively.

2.6.2 Size and Orientation

All substation modifications are within the existing substation fences.

2.6.3 Landscaping

No change in existing landscaping at the substations is anticipated or proposed.

2.6.4 Ownership and Topography

The substation location is identified on the topographic maps provided in Appendix A Figures 7, 6a and 6b.

The North Madison substation is owned by American Transmission Company, and the Huiskamp substation is owned by Madison Gas and Electric Company.

2.6.5 Transmission Lines and Structures

The North Madison and Huiskamp substations will be affected by the addition of the proposed new line terminating at the substation. New dead-end structures will be installed. Additionally, the North Madison-Sycamore line will be re-terminated at a different location on the 138 kV ring bus at North Madison Substation.

2.6.6 Access Roads

Substation access provisions will not be changed.

2.6.7 Construction Procedures

Some minor excavation work to accommodate circuit breaker, disconnect switch and other equipment foundations will occur within the current fenced area at the North Madison and Huiskamp substations. Upon completion of sub-grade construction, the site will be re-covered with a crushed gravel pad.

Construction procedures will be in accordance with all required local permit requirements. Appropriate erosion control measures as described

in the WDNR Construction Site Best Management Practices will be installed and maintained until final restoration.

2.6.8 Environmental Information

As all substation modifications will be conducted within the existing substation fence lines. No permanent incremental impact to the environment is expected from the substation work.

2.7 EMF INFORMATION

A report has been prepared documenting magnetic field calculations performed for the proposed transmission line and measurements taken at the North Madison and Huiskamp substations following the guidance in the Commission's "Information Requirements for Applications to Construct Electric Transmission Lines and Substations," (Part 2.00), Version 15B, using the ACDCLINES program developed by the Electric Power Research Institute (EPRI). The report, as summarized below is contained in Appendix C. All exhibits, figures and tables referenced in Sections 2.7.1 and 2.7.2 below are contained in the report.

2.7.1 Transmission Line EMF

Magnetic field levels for the transmission line facilities (1) at system peak and (2) under normal (defined as 80% of system peak), intact system conditions are provided in the report contained in Appendix C for the planned in service year (2008) and 10 years following (2018). Calculations were performed for each line and under-built distribution configuration on the route, using the height of the lowest conductor above ground at mid-span. The effects of distribution facilities along the line route were accounted for in the calculations where appropriate. Segments with expected distribution under-build are identified in Exhibit C1 – EMF Route Segments, Exhibit C2 – EMF Cross Reference Table, Figures 1 through 23 and Tables 1 through 26.

Magnetic field calculations for existing transmission line configurations that will be altered by the proposed project are also provided in Tables 27 and 28 and Figures 26 and 27 for the year 2008.

The magnetic field levels listed in the tables contained in the report are the root mean square (RMS) resultant level at one meter above ground. The conductor phase arrangement and phase angles, and distribution facility arrangement are provided in the pole diagrams included with the report. The transmission line phase arrangements were chosen to minimize magnetic field levels for the double-circuit configuration.

2.7.2 Existing Substations

Magnetic field measurements at the North Madison and Huiskamp substations, as required by the Commission's guidelines, are documented in Exhibit C3, Figures 24 and 25.

2.7.3 New Power Plants (requiring no line additions)

This proposed project constructs a new network transmission line. The project is not in response to new generation.

2.8 DNR PERMITS AND APPROVALS

A number of WDNR permits are anticipated to be required for this project. ATC submitted Part 1 of an application, as provided for in *Wis. Stat.* § 30.025(1b) and (1e), for all WDNR permits required for construction of the facilities proposed in this Application. A copy of the WDNR Utility Permit Application Part 1 is included in Appendix E. Detailed technical information supporting the Application for permits is contained in this Technical Support Document and is being provided to the WDNR as Part 2 of ATC's Utility Permit Application by copy of this Application to the Commission.

2.8.1 Waterways and Wetlands

Temporary clear span bridge crossings will be required at navigable waterway as described in Section 2.4.11. These crossings require approval by the WDNR under *Wis. Stat.* ch. 30.

Structures are proposed to be placed in wetland areas as described in Section 2.4.12. Placement of structures in wetlands will require approval under Section 404 of the Clean Water Act (CWA) from the U.S. Army Corps of Engineers (USACE) and water quality certification from the WDNR under Section 401 of the CWA.

2.8.2 Wetlands Alternatives Analysis

2.8.2.1 Wetlands and Route Selection Process

During initial project planning, environmental and social impacts, along with engineering feasibility and cost, were evaluated along 63 different line segments that could potentially be used to route a transmission line between the North Madison and Huiskamp substations. The segments that were eliminated following this initial evaluation included those:

- in or near highly developed residential areas;
- potentially impacting federally designated waterfowl production areas;

- potentially impacting large forested areas;
- indirect routes having higher costs;
- with the potential for disruption to other land uses.

Following initial evaluation and public input, two alternative routes were identified for further evaluation. Segments comprising these routes are detailed in Section 2.4. For those segments located along roads, both sides of the road were initially evaluated to determine the preferred alignment. These alignments were chosen based on a number of factors including impacts to residences, wetlands, and forested areas, and the location of existing distribution lines.

2.8.2.2 Wetland Avoidance and Minimization

The Preferred and the Alternative routes will avoid and minimize wetland impacts to the extent practicable. However, given the extent of wetlands in the project area and structure spanning requirements, wetland impacts cannot be completely avoided along either route. Based on standard design elements, transmission structures will typically span 400 to 600 feet. This distance is dependent upon several factors, including topography, right-of-way constraints, and the presence of distribution under-build. Shorter span distances may occur when distribution under-build is required along a segment to match distribution pole spacing. These factors can restrict ATC's flexibility to completely avoid structure placement in wetlands.

The number of structures preliminarily determined to be placed in wetlands represents a worst-case estimate. Upon route approval, the final design will further attempt to minimize wetland impacts. For example, an effort will be made to move structures near a wetland edge to outside of the wetland. However, based on the number and extent of wetlands along each route, complete avoidance of wetlands is not likely.

Access through wetlands will also be minimized to the extent practicable. For example, if construction occurs during periods when the ground is not frozen or dry, wetlands occurring along roads will be accessed from the adjacent roads near the structure location, which will eliminate the need for heavy equipment to access through the entire length of the wetland.

2.8.2.3 Construction and Restoration Methods to Minimize Wetland Impacts

The use of heavy equipment in wetlands will be avoided whenever possible. No temporary or permanent fill placement is proposed for

wetland access routes. When wetland access is required, disturbance to wetlands will be reduced by implementation of several specialized construction techniques. These techniques may include timing wetland construction during dry or frozen conditions, construction of ice roads, and the use of low ground pressure equipment, and/or construction matting materials to help minimize soil and vegetation disturbances.

Upon completion of the transmission line, ATC will complete site restoration and revegetation consistent with the activities described in Section 2.5.5.

2.8.3 Storm Water Management

Coverage under the General Permit for Storm Water Discharges Associated with Land Disturbing Construction Activities is being requested in the WDNR Utility Permit Application, Part 1.

2.8.4 Endangered/Threatened Species Incidental Take

An evaluation of potential impacts to rare species was submitted under separate cover to the WDNR Office of Energy. Based on this evaluation, it is anticipated that an Endangered/Threatened Species Incidental Take authorization will not be required. WDNR approval of this evaluation is pending. Refer to Section 2.4.7 for additional discussion of Threatened/Endangered Species.

2.9 OTHER AGENCY CORRESPONDENCE

2.9.1 ATC Correspondence

Copies of ATC correspondence with other government agencies concerning the proposed project are included in Appendix D. Because some of the material submitted is confidential, only redacted versions of that correspondence is provided within this Application. ATC has submitted the unredacted copies directly to PSCW staff.

2.9.2 Agency Responses

Copies of agency correspondence with ATC concerning the proposed project are included in Appendix D.

2.9.3 Agency Permits

Application for all WDNR permits, under the WDNR Utility Permit Application (Part 1 and 2), is included in this Application and has been concurrently submitted to the WDNR.

2.9.3.1 Local

Permits would be required for crossing various roads in the project area. Permits may be required from the Dane County Highway Department for the proposed transmission line to cross county trunk highways. Permits for crossing town roads may require issuance of town permits.

2.9.3.2 Federal

Wisconsin Department of Transportation Bureau of Aeronautics was notified of ATC's plans to construct a new transmission line due to the proximity of two airstrips along the proposed routes. No approval is expected to be needed for the proposed transmission line construction.

Activities affecting navigable waters require permits or approval from the USACE and the WDNR. The USACE requires a permit under Section 404 of the Clean Water Act to place fill into waters of the United States, which includes connected wetlands and tributaries to navigable waters of the United States. The Rivers and Harbors Act of 1899, which prohibits the obstruction or alteration of navigable waters is also covered under the USACE permitting process.

Permit approval from the USACE, pursuant to Section 404 of the Clean Water Act, may also be required for placement of fill in wetlands. ATC has requested a jurisdictional determination from the USACE for the wetlands located along the Preferred and Alternate Routes (Appendix E), and will submit a permit application when a route is approved by the Commission.

2.9.3.3 Other

The Wisconsin Department of Transportation will require a permit for transmission lines crossing any state trunk highway (STH 19 and 113). A permit will be required for placing ATC facilities within these ROW. ATC has discussed the placement of facilities along the STH 19 and 113 ROW. See Section 2.4.1.3.2 for additional information and Appendix D for documentation of WDOT correspondence.

The Wisconsin Department of Transportation Bureau of Aeronautics will be notified of ATC's plans to construct a new transmission line due to the proximity of two airstrips along the proposed routes. ATC does not anticipate permits will be required from the Bureau of Aeronautics for construction near the private airstrips identified in Section 2.4.9.

The Department of Agriculture, Trade and Consumer Protection is required to prepare an agricultural impact statement (AIS) if the transmission line project involves the actual or potential exercise of

the powers of eminent domain in the acquisition of an interest in more than five acres of land from any one farm operation. If required, an AIS may be prepared at the DATCP's discretion upon receipt of an order for this project, if the project involves five acres or less from any one farm operation.

2.10 PROPERTY OWNER INFORMATION

2.10.1 Lists

Separate alphabetized lists are provided in Appendix G and as Microsoft Excel files in Utility Name File format for the following:

2.10.1.1 Property Owners

List of property owners along and adjacent to the route centerlines for the Preferred and Alternate Routes, and substations. Property owners are identified on the tax parcel and plat maps provided in Appendix A Figures 9a and 9b.

2.10.1.2 Public Property

List of public property owners along the Preferred and Alternate Routes. Property properties are identified on the tax parcel and plat maps provided in Appendix A, Figures 9A, 9B, and 12, respectively.

2.10.1.3 Clerks

Clerks of the City of Madison, Village of Waunakee, towns of Westport and Vienna, and Dane County.

Dane County Regional Planning Commission.

2.10.1.4 State & Federal Agencies

State and federal agencies with which ATC is or will interact as a result of this proposed project including the WDNR, WisDOT and USACE.

2.10.1.5 Local Print and Broadcast Media.

The following lists are also provided in Appendix G and as Microsoft Excel files in Utility Name File format:

- State and federal legislators for the project area.
- Heads of local units of government including Dane County, city of Madison, village of Waunakee and towns of Westport and Vienna.
- Area libraries.